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EXAMINER	
BAUER, SCOTT ALLEN	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/626,254	VERGNAT ET AL.
	Examiner	Art Unit
	Scott Bauer	2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15 and 18-23* is/are rejected.

7)☒ Claim(s) *14, 16 &17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/26/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

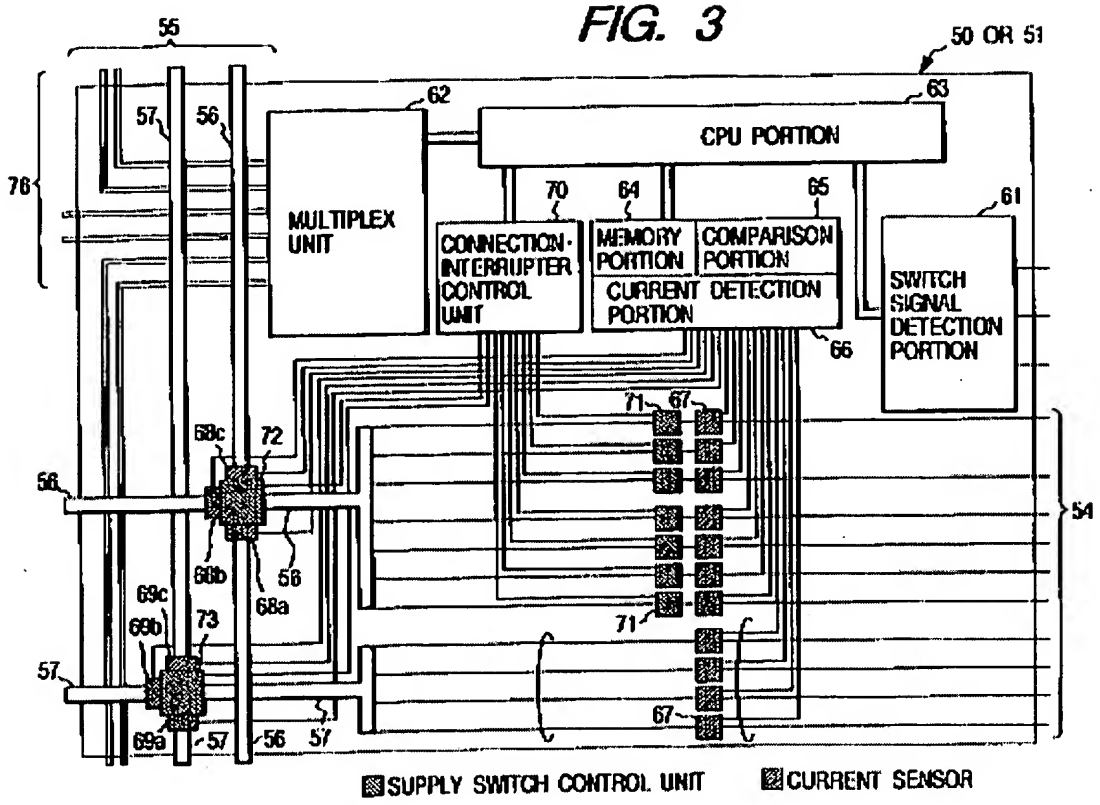
Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsumaru (US 5818673).

FIG. 3



4. With respect to Claim 1, Matsumaru et al. in Figure 3, discloses a device for protection against over-currents in an electrical energy distribution cabinet (50), which receives electrical energy supplied by at least one generator (47) and which distributes this energy to at least two loads connected to 54, which comprises: switching means (70-72), means for calculating (66) the absolute value of the difference between at least one current entering the cabinet and at least one corresponding current leaving the said cabinet, for at least one harmonic of these currents (66, 67, 68a,b,c & 69a,b,c), comparison means (65) which control the opening of the switching means if this absolute value is greater

than a predetermined threshold (61, 65 & 70). This comparison between the current values would inherently require a predetermined threshold.

5. With respect to Claim 18, Matsumaru et al. discloses an invention as set forth above that can be used in the "electrical core" of a vehicle for power distribution (Column 1 lines 5-9). The prior art structure is capable of performing the recited intended use and therefor meets the claim limitation.

6. With respect to Claim 19, Matsumaru et al. discloses a device for protection against over currents as outlined in Claim 1, which would necessarily provide the method steps recited in Claim 19.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2-7, 9-12, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumaru et al. (US 5818673), in view of Benmouyal et al. (US 6757146).

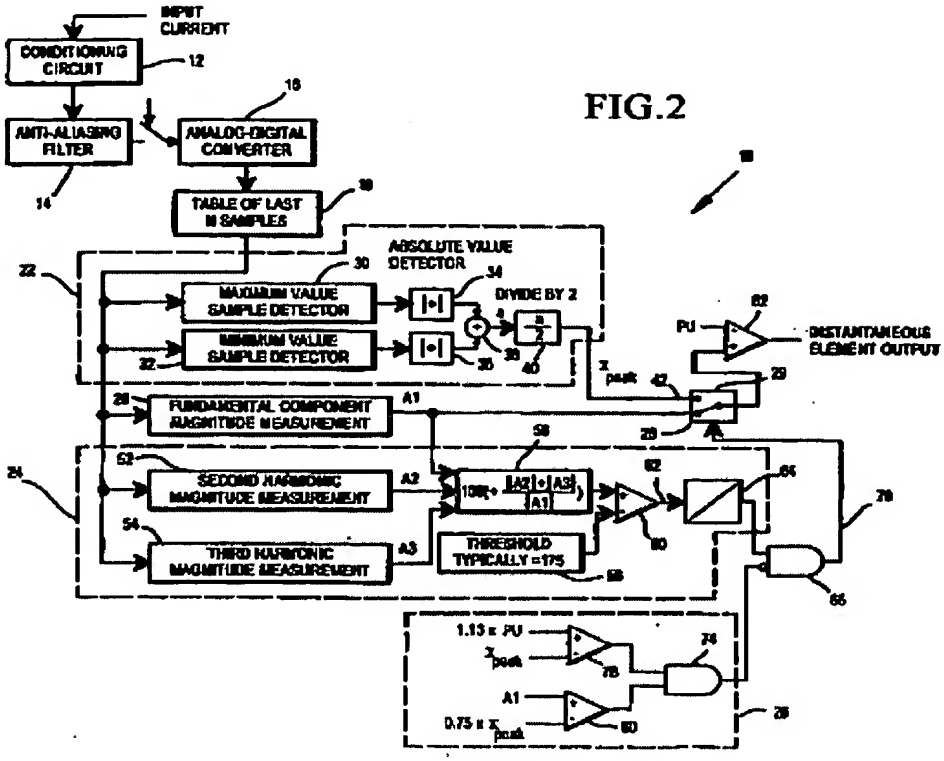


FIG.2

9. With respect to Claim 2, Matsumaru et al. teaches the invention set forth above and further teaches a means for measuring each of the different currents entering (sensors 68 a-c & 69 a-c) and leaving (67) the cabinet.

Matsumaru et al. lacks performing the calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Benmouyal et al. with Matsumaru et al. to perform a calculation on the current for at least one of its harmonics in a power

distribution box, for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source.

10. With respect to Claim 3, Matsumaru et al. teaches the invention set forth above and further teaches that the calculating means determining the difference between the current coming from a generator and entering the cabinet and the sum of the currents leaving this cabinet corresponding to the loads supplied by this generator (Fig. 3, 66-69).

Matsumaru et al. lacks performing the calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

11. With respect to Claim 4, Matsumaru et al. teaches the invention set forth above and further teaches that the second calculating means (65) determining the difference between the set of currents entering the cabinet and the set of currents leaving the cabinet (Fig 3. 65).

Matsumaru et al. lacks performing the calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

12. With respect to Claims 5 & 23, Matsumaru et al. teaches the invention and method set forth above. However, Matsumaru et al. lacks a device wherein the measurement of the value of the currents as well as the different calculations are performed cyclically, with a given sampling frequency. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

Benmouyal et al. also teaches sampling the signal at a selected sampling frequency and sending the result to an analog to digital converter (column 3 lines 27-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Matsumaru et al. with Benmouyal et al. by measuring the value of the currents, as well as performing different calculations, cyclically, with a given sampling frequency.

This would be done for the purpose of converting an analog current signal into a digital signal, in order to apply various digital filters to the signal and to allow the use of a microprocessor to perform the calculations in order to detect current faults.

13. With regard to Claim 6, Matsumaru et al. in view of Benmouyal et al. discloses the device according to Claim 5 except that it does not disclose that the sampling frequency is greater than the fundamental frequency by a factor of 10 for the sampled current supplied by the generator.

However, it has been decided that, "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

14. With respect to Claim 7, Matsumaru et al. teaches the invention set forth above. However, Matsumaru et al. lacks a device wherein the control of the switching means is only tripped if a short circuit condition is verified during a number of sampling periods greater than a threshold.

Benmouyal et al. teaches a circuit with a timer that counts the number of sampling periods once a fault is detected. He further teaches that the circuit will not send a fault signal unless the fault is detected for at least two sampling periods. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the timer of Benmouyal at al. to the control unit (Fig. 2 64) of Matsumaru at al. for the purpose of preventing a momentary spike in the current from being mistaken as a fault.

15. With respect to Claim 9, Matsumaru et al. teaches the invention set forth above and further teaches a supply switch control unit (71 & 73) wherein the switching means comprise at least one contactor (column 9 lines 28-32).

Matsumaru et al. lacks performing the calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an

ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

16. With respect to Claim 10, Matsumaru et al. teaches the invention set forth above and further teaches a means for measuring each of the different currents entering and leaving the cabinet (Fig. 3 66-69). Matsumaru lacks a calculation on the fundamental harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics including its fundamental harmonic, in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Matsumaru et al. and Benmouyal et al. in order to perform a calculation on the fundamental harmonic of the current signal, for the purpose of detecting an over-current fault on a current source supplying a fixed frequency.

17. With respect to Claim 11, Matsumaru et al. teaches the invention set forth above. Matsumaru et al. lacks performing the calculation on the sum of the fundamental harmonic and of several lowest-order harmonics of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the harmonic filters (Fig. 2 20, 52, &54) taught by Benmouyal et al. and to sum them together

in the current detection portion (Fig. 3 66) disclosed by Matsumaru et al., for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source without requiring a large amount of processing power from a computer.

18. With respect to Claim 12, Matsumaru et al teaches the invention set forth above. Matsumaru et al. lacks performing the calculation on one or more harmonics of selected order chosen from among the lowest orders of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Matsumaru et al. and Benmouyal et al. for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source without requiring a large amount of processing power from a computer.

19. With respect to Claim 20, Matsumaru et al. teaches the method set forth above and further teaches a step of measuring each of the different currents entering and leaving the cabinet performed by 66, 67, 68a-c &69a-c and a switching step performed by 71 & 72.

Matsumaru et al .lacks a step of calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a method which divides an ac

current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Benmouyal et al. with Matsumaru et al. to provide a step of calculation on the current for at least one of its harmonics in a power distribution box, for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source.

20. With respect to Claim 21, Matsumaru et al. teaches the method set forth above and further teaches a calculating step to determine the difference between the current coming from a generator and entering the cabinet and the sum of the currents leaving this cabinet corresponding to the loads supplied by this generator (Fig. 3, 66-69).

Matsumaru et al. lacks a step of calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a method which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

21. With respect to Claim 22, Matsumaru et al. teaches the method set forth above and further teaches a calculating step to determine the difference between the set of currents entering the cabinet and the set of currents leaving the cabinet performed by 65.

Matsumaru et al. lacks a step of calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a method which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

22. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumaru et al,, in view of Benmouyal et al., and further in view of Goldberg (US 3,273,018).

23. With respect to Claim 8, Matsumaru et al. teaches the invention set forth above. However, Matsumaru et al. lacks a device wherein the measurement of the value of the currents as well as the different calculations are performed cyclically, with a given sampling frequency. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

Matsumaru et al. and Benmouyal et al. do not teach an over-current protection device wherein the current measurements are performed on each of the phases. However, Goldberg teaches a current limiting circuit that measures every current line in a polyphase power supply (column 1 lines 31-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Matsumaru et al. with Benmouyal et al. and Goldberg for the purpose of detecting a current fault on a number of harmonics and any of the phases on a variable power source.

24. Claims 13, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumaru et al. in view of Andersen (US 6282499).

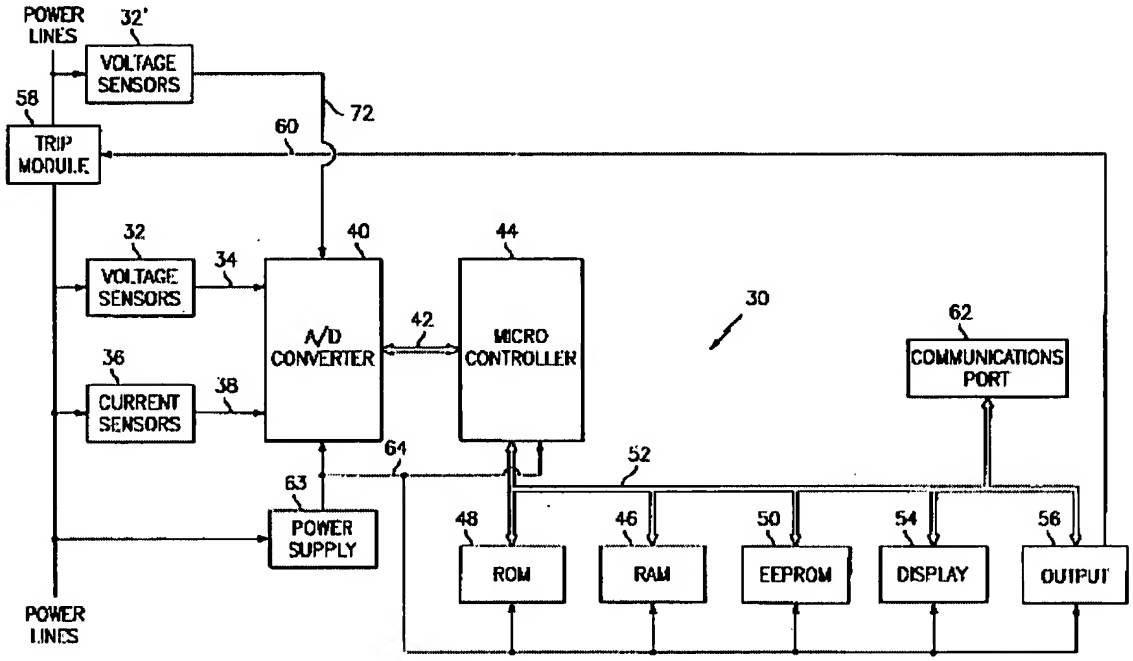


FIG. 2

25. With regard to Claims 13 & 15, Matsumaru et al. teaches the device according to Claim 1.

Matsumaru et al. does not teach that the device contains acquisition modules for measuring current where there is a digital communications bus between the current measuring device and the calculation means.

Anderson, in Figure 1, teaches a device (30) for detecting trips where voltage and current sensors (32 & 36) measure current and an A/D converter

(40), sends the digital data through a digital data bus (42), to a microcontroller (44) for calculations (column 2 lines 37-47). Anderson teaches that the sensors and A/D converter are separate elements from the microcontroller and so can be placed near the electrical connections as a module.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Matsumaru et al. with Andersen for the purpose of providing a current signal with greater noise immunity. This is because noise can be filtered out of a digital signal much better then an analog signal, and so any noise coupled into the system from the wiring can be reduced.

Allowable Subject Matter

26. Claims 14, 16 &17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

27. Claim 14 is allowable if rewritten in independent form because a controller area network bus has not been used to provide over-current protection between a data acquisition module and a calculating means in a vehicle electrical system. Alles et al. (US 6525918) teaches a vehicle distributing system with a controller (22) that checks current conditions between a power supply and a load including over-current conditions (columns 3 lines 62-67& column 4 lines 1&2). Alles et al. further teaches that the controller sends a signal to the vehicles central computer

via a CAN bus when a current fault has been detected. However, all calculations on the current are done prior to any signal being sent through the CAN bus and so does not anticipate the claim.

28. Claim 16 is allowable if rewritten in independent form because the relevant art does not teach a data acquisition module that includes a discrete Fourier transform (DFT) module. Andersen teaches that a data acquisition module contains an A/D converter, which inherently contains in succession; a low-pass filter, a sample-and-hold circuit, and a quantizing module. Anderson does not teach that the A/D converter contains a DFT module. Benmouyal et al. teaches a over-current detection system that contains digital filters which inherently contain a DFT module. However, this filtering takes place as part of a calculation system not in the data acquisition system.

29. Claim 17 is allowable if rewritten in independent form because the relevant art does not teach that the absolute value of the difference between the entering and leaving currents is temporally filtered in the calculating means. Anderson teaches that current conditions can be sent to a calculating means via a digital bus. However, Anderson does not teach that the data is filtered temporally at the calculating means and so does not anticipate the claim.

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art found pertinent but not relied upon are included in form PTO-892 Notice of References Cited and include: Bowling (US 4,054,857) and Matsuoka et al. (US 5303156).

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Bauer whose telephone number is (571)272-5986. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571)272-2058. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phuong T. Vu
Primary Patent Examiner